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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/788,832	02/28/2004	Kyung-Ju Choi	ZM921/05023	7344
27868	7590	04/28/2009		
JOHN F. SALAZAR MIDDLETON & REUTLINGER 2500 BROWN & WILLIAMSON TOWER LOUISVILLE, KY 40202			EXAMINER MATZEK, MATTHEW D	
			ART UNIT	PAPER NUMBER
			1794	
			MAIL DATE	DELIVERY MODE
			04/28/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/788,832

Applicant(s)

CHOI, KYUNG-JU

Examiner

MATTHEW D. MATZEK

Art Unit

1794

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 22-29 and 33-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 22-29 and 33-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB08)
- Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/17/2009 has been entered.

Response to Amendment

2. The amendment dated 2/17/2009 has been fully considered and entered into the Record. Independent claims 22, 29 and 33 have been amended to now recite a fibrous media having a first layered mat portion with fiber size distribution through a thickness dimension resulting in a first varying permeability within said thickness and having a first varying gradient density that increases in a thickness direction through said first layered mat portion. This new limitation is not provided for in the previously applied art and as such the all prior art rejections have been withdrawn. Claims 22-29 and 33-44 remain active.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 22-27, 33, 34, 36 and 38-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Healey (WO 01/32292 A1) in view of Pall (US 4,032,688).

a. Healey discloses a filter media comprising synthetic micro fibers wherein the diameter of the fibers is between about 0.8 to about 1.5 microns. (Abstract). In Figure 2, the reference discloses a filter media composite **10** that includes a coarse fiber layer **16** and a meltblown polymer fine fiber web **14**, which is mechanically entwined with coarse fiber layer **16**. (Refer to page 22, lines 24-30). The coarse fiber layer comprises fibers having diameters between about 5 and about 20 microns (page 5). Variation in the fiber diameter within each layer provides for the claimed varied fiber size distribution (page 3, line 1 and page 16, lines 14-18). The coarse fiber layer would be located upstream of the fine fiber layer and would serve as the claimed second layered mat portion and the fine fiber layer would serve as the first layered mat portion with its lower permeability relative to the second layered mat portion. The coarse fiber layer would possess a higher permeability relative to the fine fiber layer due to the larger pores formed between adjacent fibers. Healey fails to teach a density or permeability gradient within the first or second layered mat portions or a relative density difference between the two layers.

b. Pall discloses a process for the continuous formation of nonwoven webs for use in filters. The density of the nonwoven web may be controlled by choosing the distance between the rotating mandrel and the orifices of the spinning die through which the

polymeric material is spun (abstract). The process of Pall creates a fabric of substantially aligned fibers. By arranging the fiber spinning apparatus to lay down first the fibers from those orifices closest to the mandrel, a greater density is obtained in the portion of the layer that is closest to the mandrel than in the portion where fibers come from orifices at a greater distance to the mandrel (col. 4, line 65-col.5, line 5). This method of making the nonwoven web allows for greater or lesser density at the center, gradually or abruptly decreasing or increasing towards the outer surface of the cylinder. Pall provides for the manipulation of density and indirectly permeability (lower densities results in higher permeability) through the nonwoven web by changing the distance between the collecting mandrel and the orifices expelling the fibers.

- c. Healey and Pall are from the same field of endeavor (i.e. fabric filters).
- d. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to have varied the density within each layer and that of the overall filter of Healey as claimed because it has been shown in Pall that it is known to manipulate and vary the density within a filter fabric and differences in density affect the filter's permeability. Furthermore this variation in density and permeability allow for greater control in the resultant filtering process by selecting favorable pressure drops within and between layers and the control of where contaminants of a given size and total number are removed from the bulk fluid stream (i.e. filter efficiency).
- e. Claims 23 and 24 are rejected as the figures of Healey illustrate that the layers of the filter media may be combined in a successive manner and would intersperse when adjacent layers are bonded together (page 5). Claim 25 is rejected as the applied art

provides for entangled fibers with varied fiber size distribution. Claim 26 is rejected as Healey disclose the use of meltblown fibers (page 4). Claim 27 is rejected as Healey provides for the claimed fiber sizes (page 4 and 5). Claim 33 is rejected as the claimed porosity variations are present due to the permeability variations provided above, because the two properties have a positive correlation in that an increase in permeability increases a fabric's porosity.

f. Claim 38 is rejected as the fibers are made from synthetic polymer material, such as polypropylene (page 5). Claim 39 is rejected as one of ordinary skill in the art can readily determine the number of plies to use (pages 6 and 14, Healey) and that additional layers of each material can be included to form a final composite filter media web for particular applications and strength requirements, therefore it would have been obvious to have added an additional coarse fiber layer adjacent to the first coarse fiber layer to provide the filter additional support.

g. Claim 40 is rejected as some of the fibers would have become curled by the fiber entanglement process. Claims 41-44 are rejected fiber diameters of the first layer can only vary 0.7 microns (0.8-1.5 microns) and the second layer may vary 15 microns (5-20 microns) (pages 4 and 5 of Healey).

4. Claims 28, 29, 35 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Healey (WO 01/32292 A1) in view of Pall (US 4,032,688) as applied to claims 23 and 33 above, and further in view of Airflo (EP 0 960 645 A2). Healey and Pall fail to provide for specific permeabilities or porosities.

- a. The EP '645 reference relates to a disposable vacuum cleaner bag composition. The reference discloses a three-layer vacuum cleaner bag construction (refer to Figure 4) that comprises a filtration grade meltblown layer with fibers with diameters in the range of 1-15 micrometers and air permeability of $100\text{--}1500\text{ L}/(\text{m}^2 \times \text{s})$ [$12.3\text{--}185\text{ cfm}/\text{ft}^2$] and a high bulk meltblown layer with fibers with diameters in the range of 5-20 micrometers and an air permeability of $300\text{--}8000\text{ L}/(\text{m}^2 \times \text{s})$ [$36.9\text{--}492\text{ cfm}/\text{ft}^2$] (Table 1). The range of diameters for the fibers within each layer anticipates the claim limitations of varied fiber sizes and the media's resultant permeability and porosity within each layered mat portion. With regards to the mode the meltblown material is produced, refer to [0054] in which the reference teaches attenuating the filaments upon formation. As shown in the Figures the layers of the filter media may be combined in a successive manner and would intersperse when adjacent layers are bonded together.
- b. Healey and Airflo are from the same field of endeavor (i.e. filters).
- c. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to have looked to Airflo for guidance as to permeabilities that would allow for successful filtration.

Response to Arguments

5. Applicant's arguments with respect to claims 22-29 and 33-44 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW D. MATZEK whose telephone number is (571)272-2423. The examiner can normally be reached on M-F, 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on 571.272.1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew D Matzek/
Examiner, Art Unit 1794

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit
1794

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